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ABSTRACT

Increased attention in organizational theory on how to improve the design of a learning organization has indicated a need for the development of a theory on how employees learn in, and in relation to, organizations. This paper focuses on the part of the learning process that deals with how learners understand the object at hand, in this case, learning how to use a computer at work. An empirical research project is presented, which evaluates learners' perceptions of outcome from participation in in-service training. Two different employee perceptions are revealed: (1) the computer as a concrete, practical tool which employees must learn to use, and (2) the computer as a tool of information and communication. These different perceptions of computers are related to employees' positions in the organizational division of labor. Based on an instrumental understanding of tools, the two perceptions may be interpreted in terms of the continuity between action and cognition. The general educational theories of John Dewey are also discussed in order to provide a platform for considering the computer as an information tool. (Contains 29 references.) (AEF)

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# Learning As the New Form of Labor

**Paper for the AERA conference in San Francisco, April 1995**

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**Abstract**

Increased attention within organizational theory on how to improve design of a learning organization has indicated a need for developing an actual learning theory on how employees learn in - and in relation to - organizations. This paper should be viewed as a contribution to development of such a theory with focus on involvement of the learning employees' perception of their learning object. In specific, my point of departure is the process of learning how to use a computer in a work practice. The background is an empirical evaluation project, in which I show that employees first and foremost regard the computer as a concrete, practical tool, which they have to learn how to use. This perception differs from the view that the computer is a tool of information and communication. On the one hand, I show that the two different perceptions of the computer as a tool are related to employees' position in the organizational division of labor. On the other hand, I argue that based on an instrumental understanding of tools the two apparently different perceptions may be interpreted in the light of continuity between action and cognition. This interpretation may be very important for the development of a learning theory for employees in organizations.

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## Introduction

> *"The informated organization is a learning institution, and one of its principal purposes is the expansion of knowledge - not knowledge for its own sake (as in academic pursuit), but knowledge that comes to reside at the core of what it means to be productive. (...) The behaviors that define learning and the behaviors that define being productive are one and the same. Learning is not something that requires time out from being engaged in productive activity; learning is the heart of productive activity. To put it simply, learning is the new form of labor."*
> (Zuboff, 1988: 395).

During the past few years, the notion of the so-called learning organization has attracted much attention within the field of organization studies.[1] However, a study of the literature reveals that it is rather unclear what a learning organization in fact is. There is no consensus upon the matter. But apparently it has to do with a combination of, on the one hand, a *context*, i.e. an organization providing favorable opportunities for learning, and on the other, *employees* who are learning continuously in such a context. Thus, a learning organization deals with the constitution of a context, i. e. a specific organization of the division of labor, including guidelines for work coordination and control. Furthermore, it implies that the employees are provided with skills and knowledge to enable their learning abilities to flourish continuously. The purpose is to allow employees to make the maximum use of the means of production, e. g. information technology. However, most of the literature on organizational learning does not have explicit conceptualizations of the learning theories on which they are based, i. e. how do employees actually learn, and how do you assess whether learning takes place or not.[2]

The reason for the lack of interest in explicating a learning theory in the literature on organizational learning may be traced to its roots in organization theory, or rather the part of organization theory that focuses on the so-called *human factor* at work. The re-newed interest in the human factor's contribution to production is due to the

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[1] On the learning organization, see e. g. the following review articles: Dodgson, 1993; Huber, 1991. See also Argyris, 1992; Argyris & Schön, 1978; Schön, 1983A; 1983B.
[2] An exception is Schön, op. cit. Schön explicitly derives his inspiration from Dewey's work on logic.

enhanced globalization of economy. The pressure from lower wages in the more recently industrialized countries is part of the background for focusing on so-called "high value" production as opposed to production of "large volume" in the "old" industrialized countries.[3] The prerequisite for high value production is highly skilled and knowledgeable employees and not only investments in, e. g. new technologies. The focus upon the variable capital's (read: human factor, employees) contribution to production as opposed to the contribution of the constant capital (e. g. technology) is obviously not new within organization studies. In a study of the history of organizational development in the 20th century you will find waves of shifts in these two foci, illustrated as either investments in technology or in labor. Today, one such wave is manifesting itself in an awareness of a need for design of learning organizations in which focus is upon employees as learners within organizations.[4]

In this paper I will partly remedy the lack of an explicit learning theory in (most of) the theories on organizational learning. I shall do this by focusing on the part of a learning process that deals with how learners understand their learning object, in this case learning how to use a computer at work. The background for my study is an empirical evaluation project on learners' perception of outcome from participation in in-service training. The fact is that the design of a learning organization may very well go hand in hand with the use of, e. g. in-service training. In this way, the learning organization is supported by taking part in providing employees with skills and knowledge that will enable them to become better learners in organizations.

During my work on the above mentioned research project I gradually realized that the educational institution and the trainees differed in their definitions on what was important to learn in computer training. Furthermore, the actual teachers might subscribe to a third definition of the computer as a learning object. I realized that these discrepancies could not solely be explained by referring to the different professional backgrounds of the agents involved. What appeared to be relevant was rather the different perspectives that reflected the trainee's different notions on their actual or conceived position in the organizational division of labor. Much later, I began to understand that the different perceptions of the learning object, i. e.

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[3]See Reich, 1991; Bluestone & Bluestone, 1992.
[4]See e. g. Hollway, 1991; Rose, 1988 for interesting accounts of organization studies and organization practices in this century in the US and in the UK.

learning how to use a computer, might also be connected with the different (and not always very reflected) interpretations of what sort of tool a computer is.

It is these themes that I will attempt to address in this paper, and the succession will be as follows:
First, the empirical research project will be presented. The interpretations of trainees' perception of their learning object, the computer, derive from this project, and some interpretations will be discussed.[5] Second, I will present a theoretical framework, which may be used to understand the division of labor in organizations. The attention on the division of labor is especially focused on computer application in organizational settings. In addition, this chapter will address some of the implications of development of skills and knowledge as well as learning in organizations. Finally, I will introduce the readers to the general educational theories of John Dewey with a specific focus upon his work on learning with relation to work. The purpose of this introduction is to present his concept of tools in order to provide a platform for discussing the computer as a tool. A tool which may be seen from a Deweyan perspective as just a tool, but which from the perspective of understanding the trainees' perception may need a further clarification.

**An Educational Institution and Its Trainees**

The empirical data, in which I take my point of departure, derives from a research project made in cooperation with the Danish Union of Commercial and Clerical Employees in Denmark (HK). The project was an evaluation of trainees' outcome from participating in basic computer training courses offered by the educational institution, HK ModulData. HK ModulData was founded and is owned by the trade union HK. Today, HK ModulData has 22 local training centers with a total of 27 classrooms located all over Denmark. In 1993, HK ModulData offered 1,608 courses, in which 16,952 trainees participated. In addition to this number HK ModulData held 723 courses at the request of different organizations with participation of 6,190 trainees. By Danish standards, this is a fairly large educational institution. The trainees on the HK ModulData courses reflect the composition of members in HK with regard to gender and age. Thus, the majority of trainees are women (84 per cent in 1993), and the largest age group is trainees between 36-50 years of age (39 per cent in 1993).

[5] I have elsewhere presented my study focusing on motivation for in-service training and the impact of previous learning and educational experiences, see Elkjaer, 1993; soon to be published.

The pedagogical idea behind HK ModulData is its structure of training, which consists of different levels ("modules"), and which provides centrally produced training materials, extensively based on the use of case studies. HK ModulData believes that a broad and general understanding of the different computer applications will provide a vocational basis for any further specialization. By 1993, about 60 per cent of all courses were so-called "tool-courses", i. e. directed towards learning word processing, spreadsheets, and the like, while about 1/5 of the courses focused on a "general understanding", i. e. a general introduction to the different uses of a computer.

The purpose of the project was to examine how trainees themselves evaluated the benefits they had derived from participating in computer training courses. The concrete focus of the study was the computer training courses offered by a local HK ModulData center in one semester (spring 1990). The courses were Data Processing 1 and 2 and Electronic Word Processing 1 and 2. On the one hand, the computer training courses were directed at providing a general understanding of the different tool applications of computers, on the other, at teaching how to use the specific tool of Electronic Word Processing, which was the focus of the study. All the trainees in the study had participated in at least one of these computer training courses.[6] The trainees in the study were employed women at the age of 36-50.[7] Thus, the study focused on the trainees that constituted the majority within HK ModulData. The method of the study was to conduct semi-structured interviews with trainees, who wished to participate in the study. Out of 47 women 28 participated.[8]

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[6] 16 trainees had participated in 2 courses, while 4 had participated in 3.

[7] The average age of the participants was 43 years, the youngest being 36 years old and the oldest 49 years old.

[8] In the design of my interview guide I focused on getting a response to whether the participants had derived any benefits from participating in the above mentioned HK ModulData courses. The result was four general interview themes, which briefly can be described as follows: personal data, workplace data, data from evaluation of any benefits derived from participating in the courses and data about previous school and learning experiences. In my interpretation of the interviews I have used a combination of a reading inspired by phenomenology and a thematic reading. In practice, it meant interpretation by several stages. First, I read the interviews several times, partly with a view to coding variables (age, job, etc.) and partly in order to make a qualitative interpretation in the form of code words. I arrived at the code words by coding all the texts manually in the first phase, i.e. without leaving any text in the interviews uncoded. In the next coding phase, i.e. the computerized coding made by the program Textbase Alpha, the code words became synchronized in order to allow me to make meaningful extracts of code words for all (or the majority of the trainees). Not until this phase was completed did I use theories to acquire a deeper understanding of the interview texts. For further details about my method, see Elkjaer, 1993; Giorgi, 1975; Kvale 1983; 1987.

The trainees in the study can be described as working, on the one hand, in the office and service area (e. g. secretaries and librarian assistants), on the other , as non-office employees (e. g. laboratory workers). Expressed in numbers the ratio was 23 to 5. In the study 16 out of 28 trainees were employed in the public sector, while 12 were employed in the private sector. This representation corresponded fairly well to the overall composition of HK ModulData trainees in 1986. Today, the number of public employees who participate HK ModulData courses has declined (to approx. 1/3 of the trainees). As regards the trainees' school and educational background, 17 participants had passed a grade school examination or a junior high school examination. 10 participants had left school after the 7th, 8th or 9th grade, while a single participant had graduated from senior high school. All participants with the exception of 3 had received vocational training. Viewed as a whole, the group had very little training in data processing prior to the HK ModulData courses.

**"Just Give Me Some Time on the Keyboard!"**

The trainees in the study defined their aim to participate in computer training courses as a way of learning how to use computers at work. They regarded the computer as a *concrete, practical tool*. When the trainees arrived at the course they did not expect to receive any theoretical knowledge about the technicalities of computers, the impact of computers on work and society, or for that matter, computers as tools of communication and information. They expected the computer to be some sort of advanced typewriter or calculator, which they were going to learn how to use in order to improve their job performance now or in the near future. At best, the trainees expected to learn how to use the keyboard and their hands. I believe that this attitude reflects the trainees' perception of their work and their place in the division of labor, namely a concrete, practical job at the bottom of the organizational hierarchy. In the trainees' view, their job consisted of bodily actions, i.e. as *acting-on* materials such as letters, accounts, files, etc. They did not conceive of themselves as employees dealing with information and communication and, therefore, as *acting-with* people, using their reflective minds in stead of their fast hands and fingers.[9] This does not imply that the trainees believed that their jobs as such did not require any use of their intellectual faculties. However, using a computer was first and foremost regarded as working with a concrete, practical tool.

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[9] I have borrowed the concepts of acting-on and acting-with from Zuboff, 1988.

In the trainees' assessment of their outcome of the teaching the relation to the *world of practice* played an important role. The trainees expected the *teacher* to provide such a relation to practice. This may seem strange as teachers in general are no experts on trainees' work practice. Their field of expertise is the learning situation. The teachers were, nevertheless, assessed by their attempt to and success in bridging the gab between the trainees' context of work and the context of learning in the computer training courses. A quotation may illustrate this:

> *Then, you have all that theoretical stuff, but at the same time a practical man (the teacher, BE), who could point to examples in your everyday life. I thought that was pretty good.*

The teacher was assessed by how well he[10] understood that the trainees needed to have a connection established to their work practice, e.g. through examples on computer use from the teacher's own daily working life. If the teacher had his roots in or a connection to a world of practice with which the trainees could identify, it apparently enabled them to relate to their own daily work situations.

Another aspect, which can be compared to the need for relations to the world of practice, was the importance of exact equivalence between the computer systems at work and the computer systems in the learning context. HK ModulData explicitly regarded this aspect as less important, as their educational aim was to teach principles, i. e. principles for electronic word processing, and not, for example, the exact use of specific keys on a keyboard. However, the trainees understood the purpose of participating in such an in-service training course as an opportunity to acquire more exact skills for operating a specific keyboard. Thus, a difference in aim was quite apparent. The following quotation may illustrate this:

> *I wanted to learn how to operate my computer at work. You know, so I could use it (the learning outcome, BE) directly. But (on the course) the codes and keys you had to press were different, and, therefore, I feel that the course didn't give me anything at all.*

This trainee had some very precise expectations of a direct keyboard use-value, which were not met. The quotation stresses that it was important to the trainee to learn how to become more efficient in operating her concrete, practical work tool in her specific work practice. To fulfill such a purpose requires similar tools. Two

[10]The teachers were all men.

different work processing systems were not viewed as similar by the trainees. All in all, if the trainees did not feel more competent in their work, i. e. in using their keyboards, when they returned from a computer training course, they regarded it as more or less a waste of time.[11]

The teacher's ability to demonstrate theory in practice was a positive asset. However, it was equally significant that the teacher understood the importance of allowing time for "practice" in the learning context, i. e. time on the keyboard as opposed to the presentation of so-called "theory". In these computer training courses "theory" meant either teaching technical background knowledge about computer functions or giving instructions on the blackboard concerning a concrete program, e. g. a word processing program. The pedagogical aspect of teaching theory entailed that the trainees were sitting listening to the teacher talking from the blackboard. "Practice" meant that the trainees were working at the computer keyboard.

The time-relation between theory and practice was also considered as one of the teacher's responsibilities. A teacher was regarded as good if he allowed the trainees *enough time* on the keyboard. Another important factor in the assessment of a teacher was his ability to explain what he did concretely on the keyboard, when a trainee had asked for assistance. The important criterion was to give trainees a sense of being able to work autonomously on the keyboard after a problem had been explained to them. There was a great need for receiving individual assistance to operate the computer in the computer training classes. The transfer from a class demonstration on how to use a computer to working individually on the keyboards appeared to be difficult.

To demonstrate a relationship to the trainees' world of practice, i. e. their work situation, and to allow them adequate time to practice on the keyboard were important criteria to satisfy, if the trainees were to assess their outcome from participating in the computer training courses as positive. However, another important aspect, which relates to the perception of the computer as a tool, was the actual content of the *theory* , or what it ought to be in order to be assessed as relevant by the trainees. Primarily, the trainees regarded the instructions on how to use a computer for operating a specific program as important so-called theory. They did

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[11] In another paper I have made a point out of differentiating between trainees participating in courses for their own personal good and as employees in organizations. Here I have only dealt with the employee and the organizational perspective. See Elkjaer, op. cit.

not consider, e. g. technical background knowledge, important to learn. The trainees did not regard the computer as a technical tool, which they had to know thoroughly. They looked at it as a highly practical tool that they wanted to learn how to use in their daily work. They emphasized being allowed to "test the theory", implying that they regarded instructions on the use of the computer as theory. The following quotation illustrates this very nicely:

> *In any case, when we had theory I could hardly wait to go and put it into practice, to put it through my fingers.*

In the trainees' perception the computer was first and foremost a concrete, practical tool, which they wanted to learn how to use in order to improve their job performance. The trainees were not interested in theory as technical background knowledge about computers. They simply could not see the application value of this knowledge. They felt that they did not need such knowledge as they considered it outside their concrete sphere of work. Therefore, they regarded it as irrelevant.

By now, the reader might ask, where is the problem? Why did the educational institution, HK ModulData, not just comply with the trainees' priorities? Why make a fuss about the need for a broad and general understanding of computer application? And why receive bad evaluations from dissatisfied trainees, who believe that the so-called theory is irrelevant and takes up too much of the course, i. e. too much time is spent teaching technical background knowledge? Although related, the two different causes for dissatisfaction stem from different sources. On the one hand, the claim that it is necessary to have a general understanding to become a competent user of a computer, and on the other, the perception that the course contained too much unnecessary and irrelevant theory, have different sources in the educational institution's and the teachers' understanding of the learning object, respectively. The first was due to the political character of the educational institution, while the latter primarily was caused by the teachers' background in engineering, computer science, and the like.

HK ModulData wants the trainees to acquire a general understanding of the use of computers, and not just to become excellent keyboard punchers, because they look upon the trainees as members of the trade union, HK. HK ModulData wants to provide the union members with a proper background for exercising competent influence on the different decision processes regarding implementation of computer systems in the members' work organizations. Their goal is not just to educate the

trainees to become narrow users of computers, but in a broader sense to educate them for democratic participation in organizational life as such. However, the problem is that the majority of trainees never will be asked to contribute anything in relation to implementation of computer systems. Now, I do not wish to argue that such non-participative decision processes encourage members of organizations to be continuously learning. Probably, it is quite the contrary. However, the important issue in this context is the lack of common footsteps between how, on the one hand, HK ModulData, on the other, the trainees themselves, conceive of the trainees' place in the division of labor and the trainees' understanding of the learning object. HK ModulData arranges the teaching as if trainees were able to break the division of labor and thus become part of the decision processes regarding the use of computers in organizations. In their view, part of the learning object is that trainees need to learn about many more computer technicalities than the trainees themselves find necessary from their understanding of the learning object. The teaching of technicalities is supported by a group of teachers who have more technical than pedagogical experience.

Since I conducted my study in 1990 there has been some changes. At present, a larger number of courses are offered as "tool"-courses than as general introduction courses. This may indicate a reaction caused by the trainees' wish to learn specific keyboard skills as computer users. It may also be seen as a result of a change in perception of the trainees from first and foremost labor union members to members of organizations. In my view, this is a result of a growing individuality in workplaces today as opposed to the collectivity of organized labor.[12] However, I am sure that a conception of computers as a means of information and communication is as far away today from both the educational institution and the trainees as it was at the time of my study. This is, nevertheless, the conception of computers that holds the future, according to *Shoshana Zuboff* (1988), whose work I will present in the next chapter.

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[12]In Denmark, the percentage of organized labor is still very high as compared to e. g. the US, namely about 85%. However, the so-called Human Resource Management movement also has its advocates in this country. For a discussion on individuality and collectivity at work today related to a Human Resource Management context, see e. g. Noon, 1992.

**Organization As a Text**

The theory of Zuboff (op. cit.) takes us far away from the conception of computers as concrete, practical tools equivalent to typewriters.[13] Indeed, she claims that such an understanding of computers fails to exploit the most advantageous use of computers, namely information storage and retrieval, as well as a means of communication. In other words, computers applied as concrete, practical tools keep us in the age of industrialization and automation, whereas computers viewed as information and communication tools bring us right into the age of information and communication. And this is where we ought to be, according to Zuboff. However, this will demand a new division of labor in organizations. The use of computers as information and communication tools demands highly skilled workers who are capable of working and learning - without tight control and monitoring of, e. g. middle management. Therefore, the choice of a tool metaphor for computers, i. e. as concrete, practical tools versus information and communication tools, is also a choice that will affect the division of labor, and which skills and knowledge organizations will require of their employees.

According to Zuboff, computers can be used in two ways. On the one hand, computers can be used for *automating* operations hereby replacing the human body and mind. On the other hand, computers can generate information about the work processes for which they are used. This creates a visibility of work processes that was never possible before. The implications of the latter use of computers Zuboff calls the *informating* capacity of computers. The two different ways of using a computer reflect two different divisions of labor. The way in which computers are used for automation purposes derives from a tayloristic division of labor, where employees are supposed to perform clearly defined and specified work functions, monitored by middle management and embedded in the formalization of work standards. Within taylorism one talks about a separation of the hands and the mind, indicating that some are *doing* the work in practice, while others are planning and controlling the work, i. e. performing the *thinking* part of the work process. The other way where computers are used for information purposes implies a new division of labor, in which employees are supposed to do both the work in practice as well as the thinking part of the work processes. This will enable employees to work independently of management. Zuboff claims, furthermore, that work in informated organizations consists solely of thinking processes, i. e. processes of abstract

[13]Zuboff uses the wider concept, information technology (IT) which includes the way computers are organized in organizations, i. e. in networks around a common database.

cognition. The reason is that the work processes in an informated environment will consist of interpreting symbols on data interfaces - and these are cognitive processes.

Zuboff's point of departure for writing on new divisions of labor and new intellective skills and knowledge is computer application in an organizational context, in which computers are used together in networks. One has to imagine that the organizational setting is computers organized in networks applied in e.g. an insurance company, where all data is available through the data interface. The bodily actions of looking for files and law books as an assistance in processing e. g. a claim are not necessary in this context. Everything is available through the interface. This is why Zuboff and others[14] believe that work is becoming more abstract, that it is becoming pure cognitive processes detached from the bodily actions and the experience of the old action-centered work processes. Computers make work more abstract, because they involve an understanding of and manipulation with information. In Zuboff's words: computers textualize work, it makes work into symbols, i. e. letters, numbers, and signs. Therefore, textual representations of work processes constitute a main feature of the organizational structures and processes in a computerized organization.

The two forms of divisions of labor and the two forms of computer applications require different skills and knowledge of employees working in the respective organizational contexts. When computers are used for automation purposes, so-called a*ction-centered* skills and knowledge are needed. When work processes are not only automated, but also informated, so-called *intellective* skills and knowledge are required. The action-centered skills and knowledge can be characterized as *implicit*, because they appear through actions, and as such they are often tacit. They are also *contextual*, i. e. concrete and specific, as well as *personal*, i. e. part of the individual's experiences. These skills are learned through observation, imitation, and action rather than taught, reflected upon, or verbalized.

[14]Thus, Weick (1990: 17) also talks about "technology in the head".

In order to understand what Zuboff means when she talks about intellective skills and knowledge, it is necessary to focus on the nature of symbols.

> *"The data interface is a symbolic medium through which one produces effects and on the basis of which one derives an interpretation of "what is happening". These symbols are abstractions; they are experienced as remote from the rich sensory reality to which people are accustomed. (...) In a symbolic medium, meaning is not a given value; rather, it must be constructed."*
> (: 76)

The intellective skills and knowledge require the ability of *explicit* reasoning, i. e. reason through the use of language. When the processes of reasoning and inference, i. e. construction of meaning from text to work, take place in a social setting, i. e. an organization, there is a need for *communication* . In other words, a precondition for being able to work in informated organizational contexts is a verbal language in addition to e. g. a craft or other forms of action-centered skills and knowledge. The ability to use language, to communicate, requires an understanding of the theories behind the symbols appearing on the data interface, as well as professional knowledge about the domain with which one is working, e. g. processing insurance claims. Furthermore, intellective skills and knowledge are independent of context, i. e. abstract and general. Therefore, an intelligent employee working in an informated organization must be able to reason in a procedural way, i. e. on the premises of computer systems, so to speak. The process of learning the intellective skills and knowledge that are necessary to operate in a competent way in an informated environment is, in Zuboff's words: related to the kind of explicit, inferential, scientific reasoning traditionally associated with formal education.

The focus of Zuboff's understanding of computers as tools is information and communication. Based on this understanding she defines computers as qualitatively different tools compared with other types of technological tools. Computers can generate information about the work processes, and they can be used for communication of this information as well as other types of information. However, the transparency this may generate of organizational processes also implies the power of monitoring and exerting total control over labor. Zuboff acknowledges this potential for exercising power, but argues against it by stressing the need for creating new divisions of labor, in which employees take power, so to speak, of their own work processes. In addition, she refers to work as cognitive processes that are difficult to monitor. She argues that tight control and monitoring will undermine the

intellective learning processes, including the innovative power these processes may produce in terms of developing new ways of interpreting symbols on the data interface.

However, I find it is a problem that Zuboff in her otherwise very inspiring work establishes a *dualism* between action-centered and intellective skills and knowledge. One may say that the tayloristic division of labor in organizations separates hands and head, body and brain, by separating the performance of work from planning and control. Zuboff argues that she ties together what Taylor separated by defining all work into the brain processes such as inference, reasoning and abstract cognition. I would argue that when computers are understood as information and communication tools, it is necessary to develop skills and knowledge to connect what is apparent, i. e. the symbols on the data interface, with what is non-apparent, i. e. with what the symbols represent. However, the symbols on the data interface, i.e. the text, always represent actual work processes, actual actions, which may be physical, verbal, or textual - however, something is being done to something. Even if the actual work practices consist of handling symbols, they are directed at a specific domain and connected with specific actions. If one is not able to reflect on the relation between the actions and the symbolic representations, how can one learn to generalize, to think and to contemplate in the abstract?

If we return to my empirical study it becomes first of all clear that the trainees did not understand their participation in the HK ModulData courses as training within an educational setting that involved thinking in the abstract, i. e. developing intellective skills and knowledge. This may very well be due to the way computers were normally used in their home organizations, although some of the trainees did work in e. g. large insurance companies with highly advanced computer applications. In addition, as mentioned above, the trainees saw themselves as placed in a specific part of the division of labor that involved acting-on materials as opposed to acting-with people, i. e. as communicating with people. Or rather, even if their work did involve communicating with people - which in fact most office and service type work does - they did not see the computer as a means of communication. For example, a typical work process might be: a client calls and the employee looks up the necessary information on the computer and gives it to the client. Even so, the computer was still regarded as a tool which had to be handled through the right bodily (read: hands) actions.

In my view, the study indicates that the definition of a learning object, as e. g. the computer, is based on how an individual views her place in the division of labor. If no consensus on definition exists among the educational institution, the trainees and the teachers, the trainees will related their learning outcome to their own understanding of where they are placed in the division of labor. We may also learn that in order to change e. g. the use of computers in organizations to include a focus on information and communication, it will be necessary to change the division of labor to at least approximate good learning organizations.

I will now turn my attention to (some of) the work of *John Dewey*, as I believe his ideas may be useful in understanding the computer as a tool. First, I will present his general theory on education and learning - especially with relation to work.

**Dewey on Education**

When Dewey[15] wrote his book *Democracy and Education* (D&E) in 1916, the ideas of scientific management, i. e. tayloristic management, were slowly beginning to take form in the US.[16] This implied discussions on the training of labor, new forms of apprenticeships and new forms of industrial training that would apply to large-scale capitalist production, which needed so-called semi-skilled workers and had no use for craftsmen. Moreover, at this time labor shortage were soon to become a fact that faced all industry in the US due to the American enrollment in World War 1 (WW1). In this way, industry became enmeshed in how to enclose the human factor in the workplace in order to maintain the creation of profits.[17]

I think one has to read D&E in the above mentioned context, but also in the context of the heated debate on vocational education, which took place in the decade before WW1. The discussion focused on the transition from cultural to vocational education. Dewey, however, maintained that this was not the problem. According to him the real problem was to discover what *sort* of industrial education was needed.[18] The so-called cultural education had always been reserved for a small limited class as a luxury. Therefore, he argued in favor of an industrial education that would not only impart skills and knowledge to be used in industry, but also

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[15]Primarily, I refer to Dewey's work on learning and education: Dewey, 1916/1966; 1933 (ed.)/1910; 1938/1963.
[16]See Noble, 1977; Marshall & Tucker, 1992; Westbrook, 1991.
[17]See the beginning of the paper for the discussion of the human factor.
[18]Dewey, 1917a, here from MW10: 144ff.

develop and prepare human beings for democracy and so-called active citizenship. Dewey did not believe in preparing employees for specific skills and knowledge for the sole purpose of work. According to his view, a learner, e. g. an employee, was involved in a continuing (educational) process of growth.

Dewey's general definition of education is a continuous reorganization and reconstruction of experience. Learning takes place all the time and in all situations where people act and interact - reflect and think. Dewey's notion of learning, or rather reflective experience, grows out of a situation where a person is confused or in doubt, i. e. confronted with a problem that makes her/him stop and think. His learning theory can be described as the following stream: practice-> problem-> inquiry-> reflection-> new practice. Dewey's notion of learning implies a non-dualist understanding of doing and knowing, action and thinking. The dualist separation is replaced by a continuity of acting and knowing.

Dewey regarded education as growth, or rather a growing process, i. e. a continuous process as part of the development of life. Although learning takes place in social situations, it is the individual learner who learns, and learns through reorganizing and reconstructing her/his experience. This leads us to the definition of his concept of experience:

> *"The nature of experience can be understood only by noting that it includes an active and a passive element peculiarly combined. On the active hand, experience is* ***trying*** *- a meaning which is made explicit in the connected term experiment. On the passive, it is* ***undergoing****. When we experience something we act upon it, we do something with it; then we suffer or undergo the consequences. We do something to the thing and then it does something to us in return: such is the peculiar combination."*
> (Dewey, 1916/1966: 139, his own emphasis).

Thus, experience is not mere activity, mere doing, and it is not only change, but change which implies *reflection* on former actions in order to anticipate further consequences. The mere participation in practice, in action, does not create learning. Only a person who is able to reflect upon her/his own actions and reorganize as well as reconstruct experience by continuously employing reflection - thinking - as a means of action is learning. Reflecting and thinking are thus intentional efforts aiming at discovering specific connections between our actions and the resulting consequences, so that the two elements will become continuous. This will allow a

person to act with an end in view, i. e. in a purposeful manner. One may also say that learning begins by thinking (by having an end in view, a purpose) and results in further thinking enabling the learner to come up with new aims, etc. Thus, action is a necessary condition for thinking, but not a sufficient one. Thinking requires a language. In order to reorganize and reconstruct experience the learner needs a language that will enable her/him to e. g. generalize about specific actions and communicate them by means of words and concepts to her/himself and others.

As mentioned previously, in essence Dewey considered *vocational* education to be a deeply personal affair, i. e. a reconstruction of the experiences of individuals. However, he also considered learning to be a social process, as the individual participates in several communities of practice at work - and in society. In D&E Dewey devoted a whole chapter to the issue of "vocational aspects of education". Here he suggests to make practice - or actions - intelligent as a way of developing an individual's mind. He saw a development in work processes, such as making former tacit knowledge explicit due to the development of scientific inquiry based on the experimental development of science. The latter meant that science had become less based on pure theoretical reasoning. Instead, it focused on development through scientific experimentation with a world of practice. Such an argument implies a need for language, i. e. to verbally explicate and communicate knowledge, which is the same argument that Zuboff is emphasizing some 70 years later with relation to the development of computers. In 1916 Dewey wrote the following:

> *There are, however, obvious causes for the present conscious emphasis upon vocational education - for the disposition to make explicit and deliberate vocational implications previously tacit. (...) Industry has ceased to be essentially an empirical, rule-of-thumb procedure, handed down by custom. Its technique is now technological: that is to say, based upon machinery resulting from discoveries in mathematics, physics, chemistry, bacteriology, etc.* (D&E: 313-14).

The differentiation that Dewey makes is important. On the one hand, he says that industry is becoming less dependent on "customs" and more based upon scientific inquiry, on the other, that science is becoming more experimental. Dewey was, as many others of his time, a firm believer in science as a method of inquiry. He saw the scientification of professions as an opportunity for employees to become more skilled in making inquiries. As a result, they would develop a language that would enable them to reflect, think, and learn on a continuous basis. Thus, the explication

of tacit knowledge through the use of language is a prerequisite for thinking and learning.

In comparing Dewey's learning theory with the theory of Zuboff, it strikes one immediately that when Zuboff talks about the need for separating, on the one hand, learning based on action, on the other, learning based on interpretation of symbols on a data interface, Dewey talks about the continuity of acting and thinking. He would not regard the work in an informated organization as pure cognitive processes, as he does not consider learning from books, i. e. learning from texts, to be pure cognitive processes. Dewey was not opposed to learning from books as such, but to the *way* one could learn from books. If learning is treated as a passive acquisition of knowledge, stored in textbooks and tested as a possession by examinations, then it is not learning. In 1944, Dewey wrote the following:

> *Learning as eagerness to learn, learning how to learn, includes of course learning use of books. (...) But the usual course is to treat what is in books as an end in themselves instead of means of creating ability to see and judge things which are outside of books.*
> (LW 17: 463-64)

Dewey regarded learning as a continuity of actional processes and reflections upon these. Such processes might be punching on a keyboard with reflective thinking as well as active interpretations of symbols, i. e. texts on a data interface, flowing from the actional work. Thus, what is important is not whether the actions are interpretations of a data interface or physical actions, but the way in which these actions are understood as part of a learning process. In other words, it is how the interpretative actions are regarded as a means of understanding the processes underlying the interface work (i. e. the non-apparent processes) that matters, and how the reflection upon the actional processes takes place. When the work processes are unfolding in organizational settings with a specific division of labor, the organizational context has to support the processes of learning. But let me now turn to Dewey's notion of tools which he regarded as instrumentalities, whether the focus was language as a tool or e. g. a computer as a tool.

**The Concept of Tools**

For Dewey tools are instrumental, i.e. they are a means to achieve something else.[19] A tool is "a thing used as an agency for some concluding event." (1925: 128) Dewey compared a tool with intellectual meaning. Intellectual signs, he argued, are also instrumental. Thus, he paralleled tools with language.

> *(...) appliances and application, utensils and uses, are bound up with directions, suggestions and records made possible by speech; what has been said about the role of tools is subject to a condition supplied by language, the tool of tools.*
> (Dewey, 1925: 168)

Language is a tool for communication, for establishing a cooperation between partners. It is not a mere "expression" of something antecedent or antecedent reasoning. Language is a tool for generating meaning in cooperation with others. As such, it is a form of action. And in its instrumental use it is always a means of joint action for an end, i. e. a purposeful process of interpreting texts, symbols, etc.. It is a mode of interaction between at least two beings, a speaker and a listener.

> *The invention and use of tools have played a large part in consolidating meanings, because a tool is a thing used as means to consequences, instead of being taken directly and physically. It is intrinsically relational, anticipatory, predictive. Without reference to the absent, or "transcendence", nothing is a tool. (...) As to be a tool, or to be used as means for consequences, is to have and to endow with meaning, language, being the tool of tools, is the cherishing mother of all significance.*
> (Dewey, 1925: 185-86).

When we look at the two different perceptions of a computer as a tool that are presented in both my empirical study and in Zuboff's theoretical work, I believe Dewey would have viewed them as connected through the concept of instrumentality. Both perceptions signify a means to achieve something else, whether it is improved tools for writing documents or tools for information and communication. They are both means and both are full of meaning. The way to interpret both is by way of language as the tool of tools. However, language as well as other forms of tools originate and develop in social groups, made feasible by language. In this way, the social origin and context of tools always imply a division

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[19]The following is based upon Dewey, 1925, see also the inspiring work of Garrison, in course of publication.

of labor in connection with the use of tools.

I argue that this division of labor is discernible in the two different perceptions of computers. As mentioned earlier, I think that the understanding of computers, including learners' perception of these as tools, should be seen through the different uses of the concept of tools. A computer can be regarded as a concrete, practical tool, i. e. as a cause and effect tool: a push on the keyboard, and something happens on the computer interface.[20] However, computers can also be understood as information and communication tools, and as such they are regarded as abstract relations: one has to imagine what "really" takes place when pushing a key. In other words, there is an apparent level and a non-apparent level. In the latter case inference - reflecting - is necessary in order to understand what is going on. A construction of meaning is necessary, which is a function of inquiry, and not an intrinsic metaphysical meaning given by the data.

Therefore, one may argue that there are two definitions to choose between, both relating to computers as tools. The first definition states that computers are concrete, practical tools, the purpose of which is to facilitate and improve work practices. This definition applies to the trainees' perception in my study. They considered tools as a means to achieve concrete assistance in some of their work functions, e.g. facilitating the typing of letters to many people by means of word processing. In the second definition computers are viewed from Zuboff's perspective, namely as tools for information and communication. Apparently, both definitions refer to a learning process. The first definition, focusing on the computer as a concrete, practical tool, appeals to learning as imitation: "show us what to do on the keyboard, and we will do it". The second, emphasizing the computer as an information and communication tool, demands cognitive abilities, a capacity for abstract thinking and skills in interpreting symbols on a data interface.

Holding Dewey by the hand, one may say that neither of the two learning processes in fact are any good. The first rejects thinking, the latter doing. The question is how can one learn and develop without reflecting? And how can one learn without acting?

I have argued that the reason why the trainees in my study saw themselves as mere

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[20]See also Wirth, 1992, especially pp. 53-70 for his interesting discussion on Zuboff.

"do'ers" in part was due to their place in the division of labor in their respective organizations. Zuboff appeals in her work for changing the division of labor in order to enable employees to become "thinkers". In fact, this brings us back to the learning organization. The implication is that provided learning has to take place in organizations, the division of labor has to change substantially. Tight monitoring will prevent employees from even contemplating the possibility of reflection at work. The development of tools takes place in social groups and is a part of these, e. g. an organization. If the objective is to improve organizational learning it is necessary to consider development of the division of labor.

**Conclusion**

I began this paper with a quotation from Zuboff claiming that learning is the new form of labor, and I have tried to spell out what this might imply, if the learning processes involve learning to use computers. Furthermore, I claimed that in order to design good learning organizations, it is necessary to have a learning theory. Part of a learning theory is the learners' understanding of the learning object. When the learning object is the computer, there may be several options on definitions available. I was able to trace at least two definitions of the computer as a learning object. One focuses on the computer as a concrete, practical tool, the other views it as an information and communication tool. The definitions also have a different emphasis on the apparent and the non-apparent part of the computer as a tool. However, from an instrumental perspective the two definitions do not differ, as they may both be understood as a means for something else.

The interesting point is how the work of Zuboff with her emphasis on the computer as a non-apparent tool, i. e. using the tool requires reasoning, fits into the ideas of Dewey. This emphasis implies the use of language. Both Zuboff and Dewey believe in the explication of tacit knowledge through the need for language in the modern work processes. Thus, they both emphasize language. However, they differ in Zuboff's differentiation between physical and textual actions. Here, Dewey talks about language as actions. Consequently, he emphasizes learning as a continuity of action and thinking, while Zuboff claims a qualitative shift, subscribing to pure cognition in learning in organizations today.

Zuboff interprets what she calls the abstraction of work due to computerization in terms of demands for design of learning organizations as a need for better cognitive

skills and better communicative skills. Similarly, Dewey understood the scientification of professions in the beginning of the century in terms of learning related to work as a need for explication, for communication. But where Zuboff regards the use of language, thinking and reasoning as taking place in the brain, so to speak, as pure cognitive processes, Dewey defined language as actions, because language is used for the active construction of meaning - as a tool to generate meaning.

I wish to argue that we can understand the learning processes better in the learning organization, also in a so-called informated organization, the Deweyan way, i. e. as a continuity of acting and thinking. The reason is that it is within this understanding of the learning organization that the division of labor in fact might tie together what taylorism has separated, namely the execution of work (i. e. acting) and the planning and control (i. e. the thinking). Only by including these work processes, tied together within organizations, will the learning processes in organizations have a vital impact on the division of labor. If employees at the bottom of the hierarchy (also) are going to become learners, it will be necessary to break down the division of labor.

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